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INSTRUCTIONS FOR GROWING SUGAR BEETS.

With the exception of several slight modifications the following instructions are copied from bulletin No. 49. They are especially reliable as they are based upon seven years of successful experience at Grand Island and Norfolk, Nebraska. Under no circumstances should less than six rows be planted side by side and the rows should not be more than eighteen inches apart. On our rich Illinois soils fourteen inches will be preferable. Beets from single or outside rows or from rows wide apart have a low per cent of sugar. Instructions for taking and sending samples will be sent out next fall.

SOIL.—Never select poor land. Use the best piece available on your farm, for the richer the soil the better the crop. The best soil is so called bottom land. New land should not be selected, as it never produces a high tonnage—it should be at least two years under cultivation. Land which was manured for the previous crop will be preferable. Under no circumstances should coarse green manure be applied to the beet ground in the spring.

PLOWING.—Immediately after taking off the grain, plow shallow (2 or 3 inches) in order to prevent the weeds from going to seed. When this is done spread your field with manure and in the fall plow deep (10 to 12 inches). This is very important, because the beet is thereby enabled to penetrate into the subsoil without much obstruction, thus preventing it from growing out of the ground and allowing it to extract considerable nourishment from the lower soil. The deep plowing will also give you clean ground and will make it ready for early planting and thus insure large tonnage. Good corn land is generally good beet land.

In case the plowing has not been done in the fall, select corn-stubble ground and *plow as early in the spring* as the ground will do

to handle without sticking, *for three reasons*: 1st, because the sooner the weeds are encouraged to grow the more of them can be killed before planting the beets; 2d, because land plowed while the weather is cool will retain the moisture much longer than it will if plowed during warm weather; 3d, because it is much better to allow the ground to settle as much as possible after plowing and before preparation of seed bed so that it will become thoroughly packed, thus insuring better and quicker germination. In the spring never throw up soil that has not been stirred before; if your soil has never been plowed over 6 inches it is better to use a subsoil plow to loosen the ground *in the bottom of the furrow 4 or 5 inches deeper*. These instructions refer only to spring plowing; when good land with deep soil is plowed in the fall, it makes no difference how much new soil is turned up as it would decay in winter through the action of the frost. After spring plowing harrow or better float, once immediately, and then leave the ground as it is *until the time to prepare the seed bed, thus allowing the weeds to sprout*. If the previous crop was corn it is absolutely necessary to take the stalks and roots off the ground in the right manner in order to permit of easy and proper horse-cultivation; it will not do to plow the stalks under, however, as it cannot be done effectually the cultivator-knives bringing them back to the surface once more, and at the same time dragging along with them, more or less of the small beet plants. The best way is to remove the mold-board from the plow which will enable you to loosen the roots without turning the corn stalks under. Then gather them up with a hay rake into piles and after burning as much as possible haul off the remainder.

PREPARATION OF SEED BED.—Land that has been fall-plowed must be harrowed as soon as the frost is out of the ground and the soil is dry enough to prevent sticking. This work will level the ground, thereby holding the moisture in the soil and increase the germination of the weeds, etc. To secure a good crop, it is absolutely necessary to kill all the weeds in the ground before seeding. *Here is where most failures occur*, and if weeds are allowed to get a start the cultivation of the crop will involve much unnecessary and expensive hand-work. *Therefore, to prepare a good seed-bed*, we advise working the soil four to five inches deep with a pulverizer, or better yet with a corn cultivator, once lengthwise and once crosswise, making sure not to miss any spot in the field as it is necessary to loosen any weeds that may have already sprouted. Then harrow lengthwise and crosswise to level the soil perfectly and finish killing the weeds. After this pack the top soil (2 to 3 inches) well, with a heavy roller, never use a plank float, as floated ground is never well packed and will besides increase blowing and washing. The better the soil is packed *after the weeds are killed*, the better the beet seed will sprout. All the above work must be performed at a time when the ground is in good working condition, (that is, not too damp, as the working of wet soil must be strictly avoided.) As beet seed requires considerable moisture to germinate it would also be a great loss to the beet-grower to allow the soil during the preparation of the seed bed to dry out; therefore in dry weather or in an average season the field must be prepared and seeded the same day, this being the only way in which the moisture can be kept in the ground—a great feature in crop-raising and especially so in beet-culture.

SEEDING.—*To secure a full yield it is absolutely necessary to have a good stand.* The time of planting depends largely upon the season,

it being generally from about April 25th to May 25th, or about the season of corn planting. Not less than 20 pounds of seed per acre should be used to secure a good stand under all conditions; because, should the weather be dry the best seed will come up first and there will be enough for a good stand; on the other hand should a crust be formed on the field after a heavy rain one plant will help the other to break through the ground. *Therefore sow at least 20 pounds to the acre.*

Seeders made especially for this purpose, seeding four rows at a time and dropping the seed continuously in rows (14 to 18 inches apart, according to the fertility of the soil) will plant 10 to 12 acres per day. *Never plant over three-fourths of an inch deep*, but see that the earth is well packed around the seed by the press wheels, attached to the back of the drill, because by pressing the surface the necessary moisture for germinating in a dry season is drawn by capillary attraction out of the deeper soil. The heavier the soil and the earlier the planting, the shallower must the sowing be in order to prevent the seed from rotting in the ground. The deeper the seed is planted, especially in heavy soil, the weaker the plants will be if they come up at all. *Therefore avoid deep planting.*

Parties growing a large acreage and not having very much help, will do well to plant the crop in sections, at intervals of one or two weeks apart, in order to gain more time for thinning; however, do not plant too late, for in that case the beets will not be strong enough when the dry season sets in, about the middle of July, and will therefore suffer from the drouth, while the earlier, and consequently stronger plants, will thrive well and a heavier and better crop be insured. *It is much better to hire help during the thinning time than to plant too late.*

CULTIVATING.—This work is performed with one-horse cultivators, which work two or four rows at a time, or in case of small patches for trial purposes by hand cultivators. If, after sowing, a heavy rain should cause a crust to form on the field, the light harrow is recommended; but this only in case the seed has not germinated, as otherwise it would be better to run the cultivator over the field, following the rows, which can be done easily before the seed is up as the marks of the press-wheels can be plainly distinguished. *This work, however, can be better done by hand hoes* (11 inches wide—see hoeing). As soon as the beets break through the ground and the rows can be followed the cultivation *must* begin, *the earlier the better*, not only to destroy the weeds but to loosen the soil, which permits the air to penetrate, thus forcing the growth of the beet and improving its quality. It is very important *to kill the weeds before they get above the ground*, or at least before they become well-rooted. This can be easily accomplished by cultivating the field with the flat shovels every 8 to 10 days, care being taken to set the knives as close as possible to the rows, and never over two inches from the rows, as long as the beets are small. As the beets grow older, however, the shovels should be run gradually farther away from the beets, and also deeper until the leaves meet in the center of the rows, by which time the cultivation should have reached a *depth of 6 inches* and should then cease as the beets are ready to lay by. Besides destroying the weeds this repeated cultivation prevents evaporation from the deeper soil and secures a good and healthy growth; *Never hill your beets*, as level land keeps the moisture best.

THINNING OUT.—Care should be exercised in doing this part of the work as it is the most important of all the cultivation and care of the crop. It is very necessary that this should be done just at the right time, and the sooner it is done the better for the growth and yield of the crop. As soon as the beets have four leaves they should be thinned and must not remain longer than one week without thinning, as the roots will entwine around each other, if left longer, and make the thinning detrimental to the plant that is left. To perform this work, *the beets should be bunched (directly after a horse cultivator) with an ordinary 6 inch hoe, cutting six inches of beets out and leaving a two-inch bunch containing from 3 to 6 beets.* After the beets are bunched the healthiest plant in each bunch is selected by the thinner to be left standing, the others being pulled out by hand, together with all the weeds near by. This operation will leave one plant every nine or ten inches and the ground should be pushed up well around each (but not packed).

HOEING.—*The first hoeing, which is very important for the growth of the small plants, must be given with an ordinary 11 inch hoe between the rows of 1½ to 2 inches deep and as soon as the beets break through the ground, or if crust is formed, as soon as this occurs, following the press-wheel marks.*

As the ground will have become packed during the bunching and thinning, thus preventing proper circulation of air, and the young plants, moreover, will have become weakened by their disturbance; and for the further reason that it is cheaper to do it then, the second hoeing should be given with a hoe never later than a few days after thinning, care being taken to kill the weeds out close to the plant but in such a manner as not to loosen or injure the beets. As the cultivator only loosens and clears the ground between the rows, the hoe must perform this work between the different plants. This hoeing should be three inches deep. A similar hoeing may be necessary twice after this, the last depending upon the freedom from weeds, also upon whether the ground is loose enough to enable the roots to grow. Both of the last hoeings should be as deep as it is possible to make them without injuring or loosening the plant. Under ordinary circumstances no work should be necessary in the field after eighty days from the time of planting except the final and deepest horse-cultivation.

HARVESTING.—By the first part of October the beets are ready to harvest; the first planting generally a few weeks earlier. As the beets increase in tonnage mostly in September and the first part of October the harvesting with full force should not be started before the middle of October. The harvesting is done with a two-horse puller which loosens the beets but leaves them in the ground. After this the beets have to be pulled by hand and topped with a corn-knife at the base of the bottom leaf and can then be shipped to the factory, or siloed at the field and shipped later, after the beet growers have finished their other farm work.

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